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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER NWAONICHA, CHUKWUMA O	
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/584,148
Filing Date: June 22, 2006
Appellant(s): ORTMANN ET AL.

Harris Pitlick
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 17 June 2008 appealing from the Office action mailed 29 April 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals, Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendment After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The synthesis and purification of the carbamoylmethylphosphine oxides, Solvent Extraction and Ion Exchange 5(6), 1075-116, 1987, Gatrone et al., Facile reduction in the synthesis of phosphorylcholine affinity columns, Tetrahedron Letters, 37, No. 44, pp. 7921-7924, 1996 in view of Martin,

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Appellants' argument filed in the Appeal Brief, dated 17 June 2008, was not found convincing to overcome the 35 U.S.C. 103 rejections, issued in the Office Actions dated 29 April 2008.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

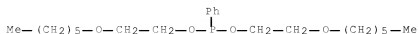
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gatrone et al., {The synthesis and purification of the carbamoylmethylphosphine oxides, Solvent Extraction and Ion Exchange (1987), 5(6), 1075-116} in view of Martin, {Facile reduction in the synthesis of phosphorylcholine affinity columns, Tetrahedron Letters, 37, No. 44, pp. 7921-7924, 1996}.

Applicants claim a process for preparing trivalent organophosphorus compounds by condensing a halogenated phosphorus compound with hydroxyl compound **comprising** the use of a basic ion exchange resin; wherein all the other variables are as defined in the claims.

Determination of the scope and content of the prior art (M.P.E.P. §2141.01)

Gatrone et al. teach the synthesis and purification of sym. and unsym. carbamoylmethylphosphine oxides and trivalent organophosphorus compounds. By reacting halogenated phosphorus compound with hydroxyl compound to produce a trivalent organophosphorus compound shown below. Several methods for purifying the extractants were studied. The use of acidic and basic ion exchange resins in conjunction was developed for the removal of acidic impurities, which are very troublesome to the extraction performances of these compounds. See the abstract and page 1080

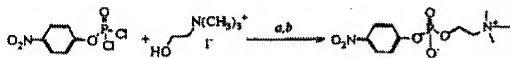


Ascertainment of the difference between the prior art and the claims (M.P.E.P., §2141.02)

Gatrone et al. process for preparing trivalent organophosphorus compounds differs from the instantly claimed process in that applicants' claim a process that employs a solvent as recited in claim 11 while Gatrone et al. teach a process that employed pyridine as a reaction medium. Another difference between applicants claimed invention and the prior art of Gatrone et al. is that applicants claim a process that employs a basic ion exchange resin while Gatrone et al. teach a process that employed acidic and basic ion exchange resins in conjunction.

However, Martin teaches the reacting of halogenated phosphorus compound with hydroxyl compound in the presence of a basic ion exchange resin as shown below.

See page 7922.



Finding of prima facie obviousness--rational and motivation (M.P.E.P., §2142-2143)

The instantly claimed process for preparing trivalent organophosphorus compounds would have been suggested to one of ordinary skill because one of ordinary skill wishing to obtain trivalent organophosphorus compounds is taught to employ the process of Gatrone et al. and Martin.

One of ordinary skill in the art would have a reasonable expectation of success in practicing the instant invention by varying the process conditions from the teaching of Gatrone et al. and Martin to arrive at the instantly claimed process for preparing trivalent organophosphorus compounds. Said person would have been motivated to practice the

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teaching of the references cited because they demonstrate that trivalent organophosphorus compounds are useful in industrial applications.

The Examiner notes that varying the reaction conditions in a chemical reaction is a well-known chemical practice to optimize the process efficiency of the system and does not constitute a patentable distinction. Also, merely modifying the process conditions such as temperature and concentration is not a patentable modification absent a showing of criticality. In *re Aller*, 220 F.2d 454, 105 U. S. P. Q. 233 (C. C. P. A. 1955).

Moreover, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. Therefore, one of ordinary skill in the art would have been motivated to correlate the teachings of *Gatrone et al.* and *Martin* in order to remove HCl impurity from the reaction between a halogenated phosphorus compound and hydroxyl compound to produce trivalent organophosphorus compound, which is used in industrial applications.

(10) Response to Argument

Appellants arguments filed 17 June 2008 in the Appeal Brief, have been fully considered but they are not persuasive.

Rejection of Claims 1-17 Under 35 USC 103 in View of *Gatrone et al.* and *Martin*

Appellants' argue that Gatrone et al described synthesis and purification, including the use of acidic and basic ion exchange resins for the removal of acidic impurities or by-products. Appellants' further argue that the use of such ion exchange resins for the removal of impurities after the reaction has been conducted is irrelevant to the presently- claimed process, wherein the at least one basic ion exchange resin is present during the carrying out of the condensation reaction. Appellants' point out that the Examiner relies on Martin's disclosure of reacting a particular halogenated phosphorus compound with a hydroxyl compound in the presence of a basic ion exchange resin (page 7922). Appellants' further state that the particular reaction disclosed by Martin involves the reaction of 4- nitrophenylphosphorodichloridate, which is a compound containing a P=O group, and which compound is different from, and not suggestive of, the particular dichloro(phenyl)phosphine of Gatrone et al, which contains no O moiety, let alone a P=O group.

Appellants' arguments have been fully considered but are not persuasive because the function of the basic ion exchange resin, like any other basic compound, is to capture or neutralize the HCl generated during the reaction, and this process technique is well known to one of ordinary skill in chemistry. Both prior art cited employed an amine/resin during the reaction and not after the reaction as argued by Appellants. See the page 1080 of Gatrone et al., {The synthesis and purification of the carbamoylmethylphosphine oxides, Solvent Extraction and Ion Exchange (1987), 5(6), 1075-116} and page 7922 of Martin, {Facile reduction in the synthesis of phosphorylcholine affinity columns, Tetrahedron Letters, 37, No. 44, pp. 7921-7924, 1996. It should be noted that prior

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arts have documented the reaction of organic diol and organophosphorous halide in the presence of a base. The use of basic ion exchange resin in the present application does not constitute a patentable distinction because basic ion exchange is a basic compound, which is taught by prior arts as stated above. Wikipedia, the free encyclopedia, defines an **ion exchange resin**: as two main basic types: **strongly basic**, quaternary amino salts, for example, trimethylammonium salt and **weakly basic** (primary, secondary and tertiary amino compounds). These basic compounds have been employed in the prior arts for the reaction of organic diol and organophosphorous halide.

Additionally, Appellants' state that the particular reaction disclosed by Martin involves the reaction of 4- nitrophenylphosphorodichloridate, which is a compound containing a P=O group, and which compound is different from, and not suggestive of, the particular dichloro(phenyl)phosphine of Gatrone et al, which contains no O moiety, let alone a P=O group. This statement is not convincing because the starting materials, the product of the reaction and the reaction medium are immaterial in this situation, what is important, is the use of a base {tertiary amine (triethyl amine), pyridine, basic ion exchange resin (strongly basic or weakly basic) or mixture of basic compounds to remove the acidic impurity or by-product generated during the reaction. The use of any base {tertiary amine (triethyl amine), pyridine, basic ion exchange resin (strongly basic compound or weakly basic compound) or mixture of basic compounds to capture or neutralize the HCl has no effect on the process conditions. Also, the order of addition of the basic compound to the reaction medium does not alter its function as HCl acceptor.

The use of a basic compound as HCl acceptor is a common practice in organic reactions, for example; prior arts have documented the use of a base to capture the HCl that is generated in the reaction between a halogenated phosphorus compound, hydroxyl compound in a solvent. Therefore, one of ordinary skill in the art would have been motivated to correlate the teachings of Gatrone et al. and Martin by employing basic ion exchange resin in order to remove HCl impurity or by-product from the reaction between a halogenated phosphorus compound and hydroxyl compound to produce trivalent organophosphorus compound because of the numerous industrial applications of trivalent organophosphorus compounds.

On page 6, second full paragraph, Appellant asserts that in the condensation reaction as claimed, basic reaction conditions and the presence of basic compounds would be highly undesirable because of side reactions and further reactions of the target organo phosphorous compounds under basic conditions. Applicants' argument is not persuasive because basic ion exchange resin is a **strongly basic or weakly basic compound**. The resin like other basic compounds employed by prior art in the reaction of a halogenated phosphorus compound with hydroxyl compound do not take part in the reaction. Furthermore, the base does not affect the product yield or affect the formation of side product. The role of a base in this particular reaction is to neutralize the HCl generated during the reaction. What may affect the reaction in terms of side reactions and further reactions of the target organo phosphorous compounds are temperature and time of reaction, **and not the base** as argued by Applicants.

Appellants' further argue that in a condensation reaction, normally basic reaction conditions, provided by the addition of a base, are needed to perform the reaction by splitting off acidic hydrogen and halogen from the precursor compounds to be condensed and immediately neutralizing the generated acid in the form of the salts with the base, as discussed above and as described in the specification. That is, the specification describes advantages in the use of a basic ion exchange resin compared to that of a basic compound.

Appellants' arguments have been fully considered but they are not persuasive for the same reasons stated above. The purpose of the basic compound is to neutralize the acidic reaction medium by removing the HCl. The reaction of P-Cl and R-OH is the normal acid-base reaction, and the addition of the basic ion exchange resin or basic compound does not influence the interaction of the reactants (P-Cl and R-OH). The basic ion exchange resin or basic compound employ in the reaction of P-Cl and R-OH does not react with either P-Cl or R-OH but interact with the HCl generated during the reaction thereby neutralizing the reaction medium. Acidic reaction condition is not maintained in the reaction medium as argued by Appellants' because the reaction medium is neutralized by the basic ion exchange resin or basic compound. Additionally, Applicants have not demonstrated the benefit of using of basic ion exchange resin in terms of unexpected result; for example, higher yield of product or higher purity product. There is no side-by-side data in the specification to show the superior performance of Appellants' claimed process as opposed to the prior arts process.

In view of what is known in the prior arts at the time of the invention, one of ordinary skill in the art would have been motivated to correlate the teachings of Gatrone et al. and Martin in order to prepare trivalent organophosphorus compounds by the reaction of alcohol and organophosphorous halide in the presence of any basic material and a solvent because of the numerous and vital industrial applications of trivalent organophosphorus compounds.

Moreover, all the claimed elements were known in the prior arts and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Claims 5 and 13 are rejected for the reasons given above because the size of the basic ion exchange resin and the process as recited in claim 5 do not alter the process steps or conditions as recited in claim 1. The Examiner notes that simply reversing the order of steps in a multi-step process is not a patentable modification absent unexpected or unobvious results. Ex parte Rubin, 128 U.S.P.Q. 440 (P.O.B.A 1959). Furthermore, the broad range recited in claim 13 encompasses the standard size range of Amberlyst A26 used by Gatrone.

All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

(11) Related Proceeding Appendix

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No decision rendered by a court or the Board is identified by the Examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believe that the 103 rejections should be sustained.

Respectfully Submitted,

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